WASHINGTON DEPARTMENT OF ECOLOGY

ENVIRONMENTAL ASSESSMENT PROGRAM

FRESHWATER MONITORING UNIT

STREAM DISCHARGE TECHNICAL NOTES

STATION ID: 19E060

STATION NAME: Deep Creek

WATER YEAR: 2006

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Introduction

Watershed Description

The Deep Creek watershed contains one of three stations in the Intensively Monitored Watersheds (IMW) project Strait of Juan de Fuca complex. The stream is approximately 7.9 miles long, the basin area is 17.3 square miles. Watershed elevations range from sea level to 3,020 feet. Precipitation falls primarily as rain between October and May, averaging 86 inches annually. Crescent formation volcanic rocks in the upper watershed, and marine sedimentary rock overlain by terraces of glacial deposits in the lower watershed, coarsely define the complex geology of the watershed. The primary land use for the last century has been commercial forestry. Three vegetation zones define the basin--Sitka spruce in the valley bottoms, Western hemlock in the low to mid elevations, and Silver fir in the headwaters. The fish species present include Coho salmon, chum salmon, steelhead or rainbow trout, cutthroat trout, Pacific lamprey, western brook lamprey, torrent sculpin,and reticulate sculpin.

Gage Location

The gaging station for Deep Creek is located in Clallam County, Washington, approximately 27 miles west of Port Angeles. Deep Creek is a tributary to the Strait of Juan de Fuca. The gage, placed on the left bank, is on the downstream side of the Highway 112 bridge at approximately river mile 0.2. The stage record is tidally influenced. Tidal spikes in the stage record are removed.

Table 1.

Drainage Area (square miles)	17.3
Latitude (degrees, minutes, seconds)	48 10 21 N
Longitude (degrees, minutes, seconds)	124 01 36 W

Discharge

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	68.7
Median Annual Discharge (cfs)	24.1
Maximum Daily Mean Discharge (cfs)	542
Minimum Daily Mean Discharge (cfs)	2.5
Maximum Instantaneous Discharge (cfs)	602
Minimum Instantaneous Discharge (cfs)	2.5
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	239
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	3.0
Number of Days Discharge is Greater Than Range of Ratings	11
Number of Days Discharge is Less Than Range of Ratings	0

Note: Statistics displayed in Table 2 may not include values in which the predicted discharge exceeds the range of ratings.

Narrative

Eleven of the highest days in the predicted discharge record were excluded from some statistics in Table 2. The mean annual discharge, median annual discharge, maximum daily mean discharge, and maximum instantaneous discharge in Table 2 are less than the actual values. An early autumn storm in late September elevated flows above baseflow for the start of the water year. Small to moderate events continued through October and early November. A relatively long, dry period persisted from late November to late December. The next two months were marked by a series of moderately large winter storms. Two smaller spring storms in March heralded the end of significant precipitation events. After a minor event in April, and even smaller events in late May and June, the runoff at Deep Creek declined gradually and steadily through summer to baseflow conditions.

Error Analysis

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	d/n/a
Weighted Rating Error (% of discharge)	7.7
Total Potential Error (% of discharge)	d/n/a

Rating Table(s)

Table 4. Rating Table Summary

Rating Table No.	2	3	201
Period of Ratings	10/01-02/11	12/18-05/24	03/01-08/08
Range of Ratings (cfs)	1.3-602	1.7-602	1.3-602
No. of Defining Measurements	7	4	7
Rating Error (%)	9.0	6.2	9.0

Rating Table No.	301		
Period of Ratings	06/19-09/30		
Range of Ratings (cfs)	1.7-602		
No. of Defining Measurements	4		
Rating Error (%)	6.2		

Rating Table No.			
Period of Ratings			
Range of Ratings (cfs)			
No. of Defining Measurements			
Rating Error (%)			

Narrative

Rating 2 predicted discharge for the beginning of water year 2006. A series of moderately large storms in January and February filled the control, resulting in a shift to rating 3. Rating 3 predicted discharge through the spring until slight scouring of the control resulted in a shift back to rating 2 (201). Gradual filling of the control through mid-summer again resulted in a shift back to rating 3 (301). Ratings 201 and 301 are replicas of ratings 2 and 3.

Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	1.60
Maximum Recorded Stage (feet)	6.67
Range of Recorded Stage (feet)	5.07
Number of Un-Reported Days	11
Number of Days Qualified as Estimates	0
Number of Days Qualified as Unreliable Estimates	0

Narrative

The stage record for Deep Creek during water year 2006 is continuous and complete. Tidal spikes in the stage record were manually removed. Relatively minor discrepancies between the logged stage record and observations of the primary gage index (a staff gage) were resolved by filter adjusting the logged record to match the observed primary gage index values.

Modeled Discharge

Table 6. Model Summary

Model Type (Slope conveyance, other, none)	none
Range of Modeled Stage (feet)	
Range of Modeled Discharge (cfs)	
Valid Period for Model	
Model Confidence	

Surveys

Table 7. Survey Type and Date (station, cross section, longitudinal)

Type	Date
Station	10/03/2006

Activities Completed

A continuously monitoring turbidity probe and ISCO compositor was installed in September 2006 as part of the IMW projects turbidity threshold sampling initiative.